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MAY 2.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-four members present.

MR. THOMAS MEEHAN exhibited some flowers of the *Magnolia purpurea*, which were much curved toward the apex, and said that this curvature was always towards the north when the flowers opened in the full sun. This had always been a subject of speculation with him, as the tendency of growing vegetation was usually towards the south, or towards the greatest source of light. This season he has had the opportunity of examining many hundred, and almost all were due north; a few were either a little west or east of north. The plants bearing these flowers were low, and the sun had full power on all the opening blossoms. That this northern tendency of the curve was, however, due to the sun, was evident from the fact that when growing under the shade of trees, the flowers of this plant were perpendicular, and of uniform growth all round.

This season he believed he had found the explanation. He observed the same curving towards the north in the expanding male catkins of *Salix caprea*. These, so long as elongation continued, were perpendicular; when this ceased, the stamens developed first on the warmest side, the side next the sun. The growth of these expanding stamens was very rapid; and he had observed that this growth not only was towards the light, but the growing parts had the power of *drawing part of the axis to which it was attached with it*. A very small rise in the temperature was sufficient to excite growth in the willow, and the difference between the sun striking against the south side of the catkin, and the heat which could be commanded by the north side, made a difference of several days in the expansion of the stamens on the respective sides. Sometimes a catkin would be formed on the north side of the plant, in the shade of the tree, in which case the most heat coming from the north, that side of the catkin would expand its stamens first, but slowly. In this case there would be a slight curve towards the south. In the case of curved catkins, the curve was always greatest after a hot burst of sun, when the stamens grew most rapidly. When the northern side developed, the axis curved back again, so that the ultimate direction was perpendicular, as it was in the beginning.

The growth of the flower of magnolia being comparatively slower, did not furnish the same evidence in detail; but the results were the same, and no doubt were influenced by the same law. The flowers curved to the north while expanding; but after a few days of full opening the north side caught up, and the flowers were 1871.]

finally erect, as in the case of the willow catkin. He thought we might safely conclude from these facts that vegetation not only grew towards the light, but exercised at the same time a lifting force which we had not before recognized.

He believed no explanation had ever been given that was generally accepted as to the curving of many kinds of pine-cones. Possibly the facts now offered might furnish the key.

Mr. Meehan then exhibited some expanding buds of *Fraxinus quadrangulata*, and showed that they had *no bud-scales* as other species of ash had. These other species had two pairs, the outer broad and somewhat thin, and which underwent little change in spring; the other and inner often grew into a short succulent sub-petiole. In the *F. quadrangulata*, at the termination of its full growth, instead of the usual broad scales, there were but minute black specks, which in the spring grew out into fully developed leaves. The buds of this species of ash were, therefore, "naked" buds. He had under his observation only one tree of this kind; but he took it for granted it was the usual condition of other trees of the species.

On his grounds were many hundred of *Fraxinus excelsior*, and he noted this season a large number of them, of which he exhibited specimens, that had the same characteristic buds as in the *F. quadrangulata*. Examining further, he found that in all cases of this kind the buds terminated second growths of last year. In all other cases, where the normal solitary cycle of growth was all that was made, the usual broad bud-scales were present. Thus we arrived at the important conclusion that a law which operated with sufficient uniformity in the case of *F. quadrangulata* to constitute a specific character, existed only in special cases in another species. What that law is, he thought yet unknown. To most persons it would be a sufficient answer to say, it was the *late second growth* which caused the non-development of true bud-scales in the case of the *F. excelsior*; but, remembering the case of *F. quadrangulata*, where the same facts existed without the second growth, we could only say that this circumstance merely aided the action of a law, which could operate without it.

He suggested that the science of botany had suffered from the too hasty assumption of explanation of facts. For instance, it was taught in our best text-books that the "office of bud-scales was to protect the tender parts beneath." It would strike any one at once that it ought to be as necessary for *F. quadrangulata* to have this protection as *F. excelsior*; but not only this, but here we have the fact of *F. excelsior* getting through the winter as well without as with them, and that, too, on the secondary, and as many would suppose more immature, growth.

MR. MEEHAN further referred to a paper which he contributed to the "Proceedings" of the Academy last fall, on the flowers of *Ambrosia artemisiæfolia*, in which he showed that the horns of the

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achenia were but the remains of other flowers which had been absorbed by the central and stronger one in an early stage of their existence, and by this adnation had become an integral part of the structure of the flower.

He had now to exhibit to the Academy a small plant of this species, which had grown in a pot in his hot-house during winter, and which was in flower, and not only exhibited this fact better than the specimens he had brought to the notice of members last year, but also presented some other very remarkable phenomena. Here was a regular gradation of true horns down to an entire separation from the central achenium, in which case these detached horns bore the usual twin pistils, or rather elongated stigmas. But what was remarkable in this case was that beneath all these normal and abnormal pericarpia some small bulbels issued from the stem, and these also had stigmas more or less perfectly developed.

The whole plant, he observed, was in many respects a curiosity, which would rival the art-produced Japanese dwarf. Here was a plant a little over an inch in height, which, at the second node above the cotyledons, commenced to produce female flowers. There were no male flowers. Indeed, it was not impaired nutrition which gave it its dwarf character, for the soil in which it was growing was very rich, and the bright green color of the plant was opposed to all idea of starvation.

Another suggestion occurred to him in connection with the little plant exhibited. The ambrosia was the common rag-weed of our cultivated ground. When such plots of ground were put down into grass, no more of this weed appeared; yet, though this ground remained in sod an unlimited number of years, when broken up the ambrosia always appeared in immense numbers. Though we know that the seeds of this weed, preserved as ordinary garden-seeds are, will only live a season at best, yet all farmers and many good botanists believe that the plants spring from seeds of the crop which ripened many years before, and which have retained their vitality through all the period. But if such pigmy plants as these can perfect their seeds, we see at once how hundreds can exist amongst the grass and other vegetation, thus perfecting seeds and perpetuating themselves year after year successively, fully accounting for the appearance of plants on the subsequent breaking up of the sod, without resorting to a mere imaginary theory of wonderful vitality.

MR. GENTRY directed attention to the fact that *Alyssum calycinum*, Lin., a native of Europe, was growing abundantly on the western side of the Mt. Airy water-works, near the city, where it appears to have permanently established itself.